33098

PROPOSED PLAN

AUGUST 1988

US EPA
REGION III

DRAKE CHEMICAL SITE
LOCK HAVEN, PENNSYLVANIA

INTRODUCTION

In 1980, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), now known as Superfund, was enacted to provide federal authority and funding to respond to abandoned or uncontrolled hazardous waste sites that posed actual or potential threats to human health or the environment. CERCLA gave the U.S. Environmental Protection Agency (EPA) the primary responsibility for enforcement and remediation activities which must be conducted according to National Oil and Hazardous Substances Contingency Plan (NCP) and Superfund Amendments and Reauthorization Act of 1986 (SARA) guidelines. To be eligible for long-term Superfund remediation sites must be identified on the National Priorities List (NPL), a list of the nation's most serious hazardous waste sites.

The Drake Chemical Site was listed on the NPL in July 1982. Since then, the EPA has conducted numerous Superfund remedial actions and investigations designed to identify and evaluate appropriate remedial technologies that will abate or remove contamination, promote human health, and protect the environment. Because of the complexity of site conditions, site remediation has been divided into manageable phases and units. Phase I is finished, and Phase II should be completed in early 1989.

This Proposed Plan summarizes site history and previous remedial actions and outlines the findings and recommendations of the Phase III Remedial Investigation (RI) and the Phase III Feasibility Study (FS) which were conducted recently by EPA. At the back of the plan is a glossary of terms used in the text.

SITE BACKGROUND

The Drake Chemical Site is an inactive chemical manufacturing facility that operated from 1962 to 1981 (see Figure 1, Site Location Map). During its operation, the Drake Chemical Company manufactured chemical intermediates used in the dye, cosmetics, textiles, pharmaceuticals, and pesticides industries. Prior to 1962, site use is uncertain; however, it is believed that chemicals were produced at the site as early as 1951.

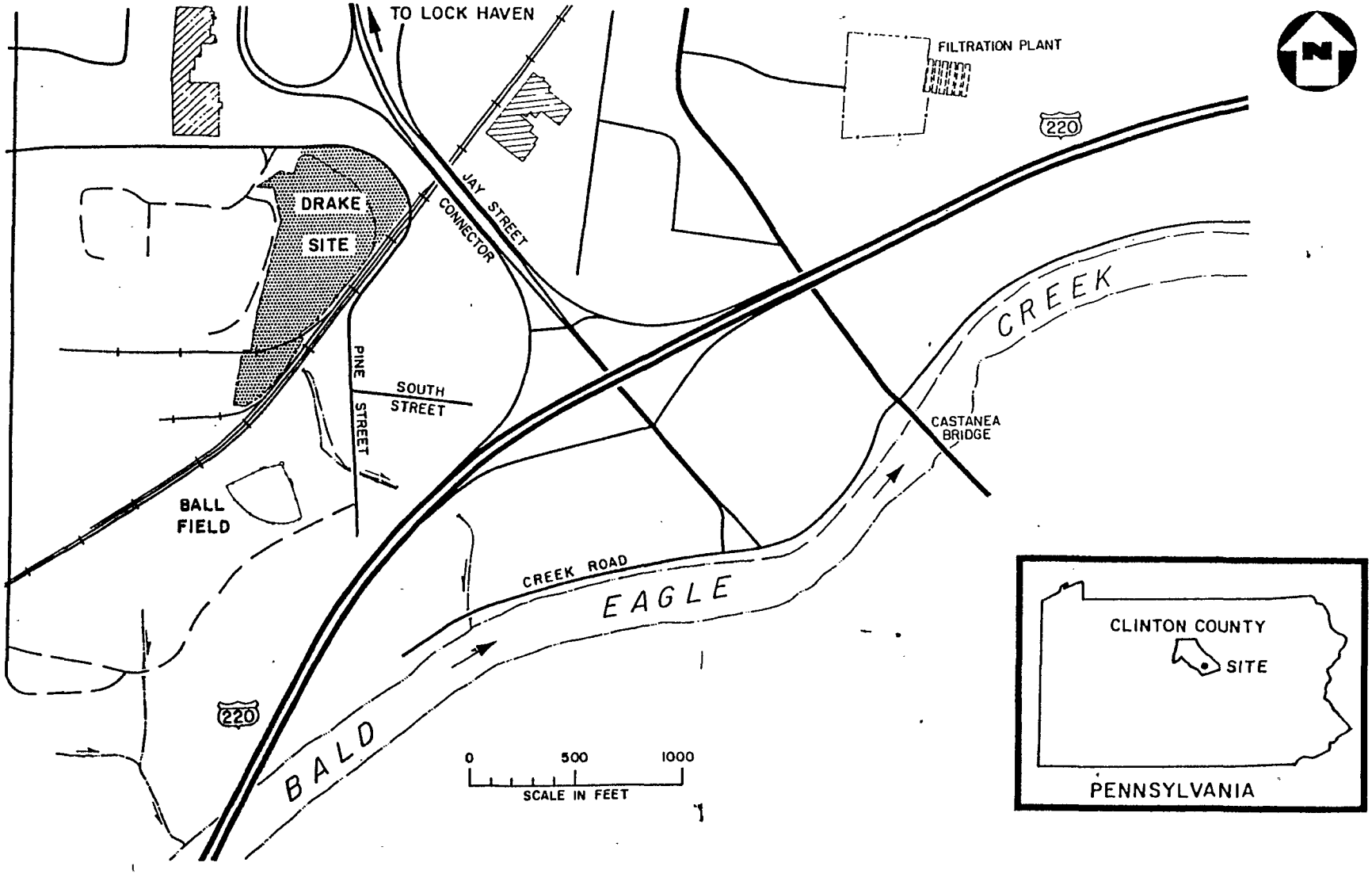

FIGURE 1

SITE LOCATION MAP
DRAKE CHEMICAL SITE
LOCK HAVEN, PENNSYLVANIA

Immediately adjacent to and west of the Drake Chemical Site is the American Color and Chemical Company which is currently undergoing a Resource Conservation and Recovery Act (RCRA) cleanup. The Hammermill Paper Company operates an industrial facility 1/2-mile southwest of the site. Within 1/4-mile are an apartment complex, a shopping center, and Castanea Township Park. A major tributary of the Susquehanna River, Bald Eagle Creek, flows less than 1/2-mile south of the site; 3/4-mile north, the creek flows into the West Branch of the Susquehanna River.

Site features at the 12.5-acre Drake Chemical Site include two synthetic-lined wastewater treatment lagoons, an unlined leachate lagoon, a dry and unlined "canal" lagoon, and a synthetic-lined and covered landfill containing materials excavated earlier (see Figure 2, Site Plan). Much of the site surface is covered by assorted debris, chemical sludge, and contaminated soils. Buildings, tanks, and surface impoundments remaining onsite are currently slated for demolition and removal in late 1988 or early 1989 as part of the Phase II work.

The Drake Chemical Company was cited many times, by state and federal agencies, for violating environmental and health and safety regulations. In 1982, after the company failed to respond to EPA's requests to cleanup the site, the EPA began an emergency removal action. As a result, surface drums, surface sludges, and liquids contained in process and storage tanks were removed, and the site was fenced. Subsequently, a Superfund Remedial Investigation/Feasibility Study (RI/FS) was initiated in 1983. The RI/FS was divided into two areas of concentration: Phase I focused on a leachate stream that ran off site through Castanea Township Park. Following completion of the Phase I RI/FS in 1984, a Record of Decision (ROD) led to remediation of the leachate stream involving covering the upper reaches of the stream with natural soils and a clay cap and installing a conduit drain in the lower reaches of the stream. Contaminated sediments that were excavated from the stream area were placed on site in a temporary storage impoundment.

The Phase II RI/FS was divided into two operable units, one addressing onsite buildings and surface features, and the other addressing soils, sludges, and groundwater. The Phase II RI concluded that buildings and other surface features on site were contaminated and required remediation. Based on the Phase II RI/FS, a Phase II ROD was signed in May 1986. It recommended draining and removing two lined lagoons and disposing of the materials. The Phase II ROD also included demolition of the buildings and tanks for disposal in an offsite landfill.

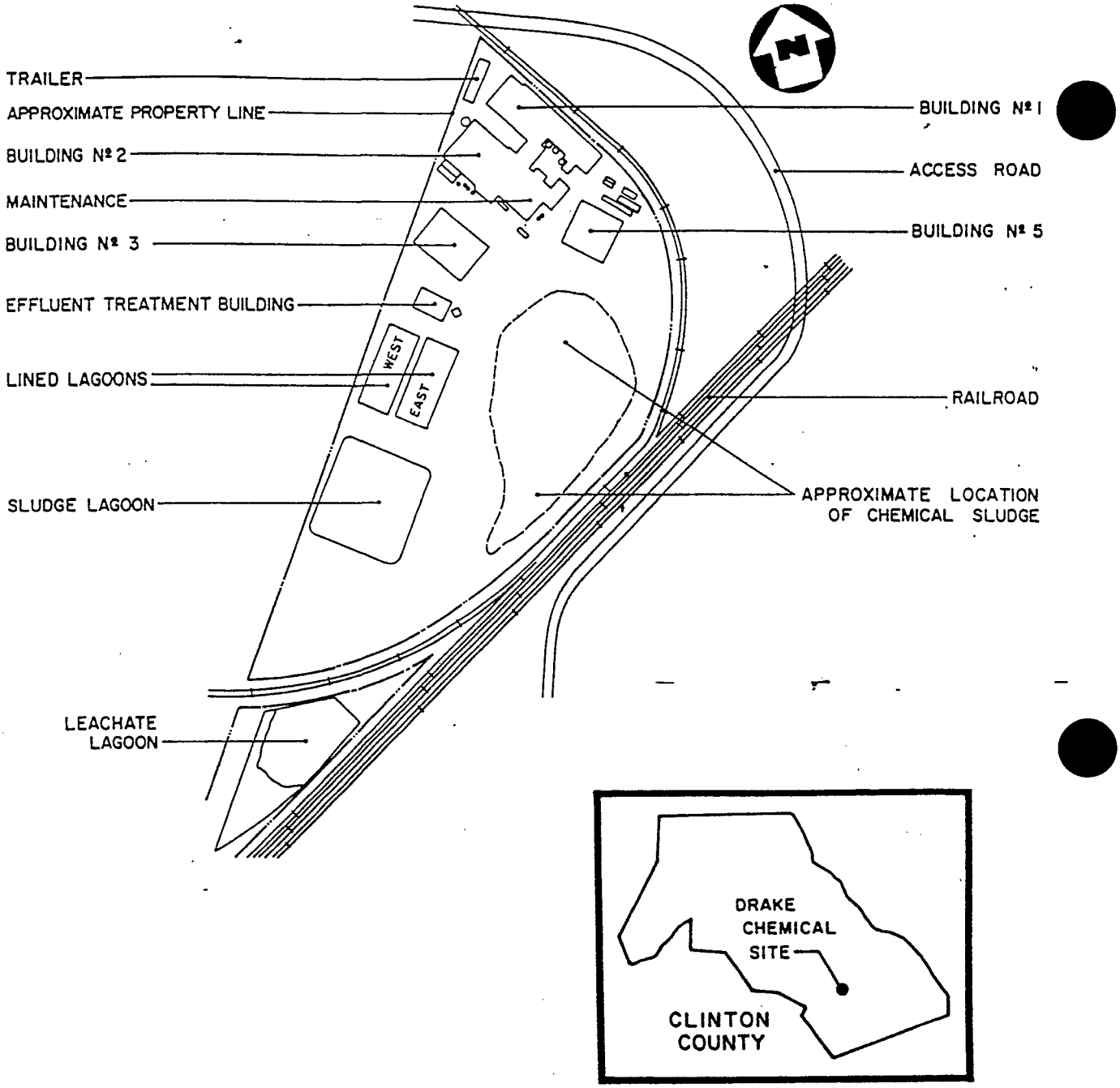

FIGURE 2

SITE PLAN
DRAKE CHEMICAL SITE
LOCK HAVEN, PENNSYLVANIA
NOT TO SCALE

THE NATURE AND EXTENT OF CONTAMINATION

The Phase III RI reaffirmed the wide-spread contamination of the site and indicated a much larger quantity of contaminated soils/sludges than was previously known. Organic compounds represent the major concern and appear to be evenly distributed throughout the soils/sludges. The herbicide "fenac", an organic compound formerly manufactured onsite, was detected in offsite surface waters and sediments. Cadmium appears to be the only inorganic compound of consequence that is present. All metals detected in offsite surface waters and sediments were also detected in native soil samples. As a result, it is impossible to clearly link the metals found in the surface water and sediment samples with the Drake Chemical Site.

According to the Phase III RI, contaminant migration from the site occurs primarily via the groundwater. As precipitation filters through the contaminated soils/sludges on site, some of the chemicals in these materials are dissolved and carried into the groundwater. Groundwater from beneath the Drake Chemical Site flows to the southeast and discharges into Bald Eagle Creek. The presence of some site-related contaminants in creek sediments is an indication that contaminants from the site have already discharged into the surface water. To facilitate assessment of groundwater contamination and treatment alternatives, the subsurface study area was divided into three zones: Zone 1 refers to the area directly beneath the site; Zone 2 is the area between the site and State Route 220; and Zone 3 is the area between State Route 220 and Bald Eagle Creek.

In general, the Phase III RI concluded that Maximum Contaminant Levels (MCLs) have been exceeded in all three groundwater zones but that they have not been exceeded in offsite surface water nor in the bedrock aquifer in any of the zones. Contaminant concentrations are directly proportionate to distance from the Drake Chemical Site with the greatest concentrations being in Zone 1 and the least in Zone 3. The FS identified solid wastes (soils/sludges/sediments) as Operable Unit A and liquid wastes (leachate and groundwaters) as Operable Unit B.

DEVELOPMENT OF REMEDIAL ACTION ALTERNATIVES (RAAs)

During the Phase III FS, remedial technologies were studied to determine which would be applicable to the specific conditions at the Drake Chemical Site. Screening of the technologies was based on data from the Phase III RI and on Applicable and Relevant and Appropriate Requirements (ARARs), as described by the NCP as amended by SARA. ARARs can be loosely defined as requirements of state or federal environmental laws. EPA must ensure that the Superfund response action is consistent with all

pertinent state and federal environmental requirements. ARARs applied to the site fall into three broad categories: **Contaminant-specific ARARs** govern the level of cleanup to be attained. For example, MCLs concern individual substances and identify concentration levels for each that can not be exceeded. **Location-specific ARARs** are those concerning natural or man-made site characteristics, such as wetlands, scenic rivers, historic districts, and aquifer designations. Of special concern at the Drake Chemical Site are the location of the site in the floodplains of both the Susquehanna River and Bald Eagle Creek and the designation of the groundwater aquifer as a protected potential drinking water supply. ARARs that pertain to the implementation of a particular remedy are **action-specific ARARs.** Examples include monitoring requirements, effluent discharge limitations, and occupational health and safety requirements. In addition to these considerations, each remedial technology selection must also be guided by an evaluation of the following criteria: short-term effectiveness; long-term effectiveness and permanence; reduction of toxicity, mobility, or volume; ease of implementation; cost; protection of human health and the environment; and acceptability to the state and community.

During the FS, many technologies were evaluated for the Drake Chemical Site. Those that were judged applicable were combined into process schemes, called RAAs. For Operable Unit A, several alternatives were selected for continued consideration. Some are single-technology alternatives that have been sufficiently developed and tested so that their use at the Drake Chemical Site should be highly successful. These recommended alternatives for Operable Unit A (Alternatives A-1 and B-1) have the proven ability to treat all contaminant types present at the site for the full range of contaminant concentrations. Other alternatives (Alternatives C-1 and D-1) will require moderate to extensive treatability tests, because they are emerging technologies for hazardous waste applications. The mixture of organic and inorganic contaminants present in the groundwater requires a combination of treatment technologies to achieve treatment goals for Operable Unit B. All the RAAs developed involve groundwater pumping and treating methods, but each RAA features a different secondary treatment step in the wastewater treatment process.

The RAAs under consideration for Operable Units A and B are described below. For each unit, a No-Action Alternative is considered, as required by law. No-Action would involve long-term monitoring of groundwater, but no remedial actions would be initiated. With the exception of the No-Action alternatives, virtually all of the RAAs include flood protection measures in the form of dikes because of the site's location in a floodplain.

Operable Unit A - Sludge, Soil, and Sediment RAAs

1) No action with monitoring.

2) A-1 - Excavating all sludges/soils/sediments; treating with rotary kiln incineration; disposing of incinerator ash; backfilling, regrading, and revegetating the site.

3) B-1 - Excavating all sludges/soils/sediments; treating with infrared incineration; disposing of incinerator ash; backfilling, regrading, and revegetating the site.

4) C-1 - Treatment using in-situ vitrification to immobilize contaminants; backfilling, regrading, and revegetating the site.

5) D-1 - Installing injection and extraction wells above the water table for in-situ soil washing, using effluent from the Operable Unit B Wastewater Treatment Plant (WWTP) as a flushing agent, then treating the resulting contaminated wastewater stream.

Operable Unit B - Groundwater RAAs

1) No action with monitoring.

2) Modified RAA-1 - Installing extraction wells; building a treatment plant featuring sand filtration and carbon adsorption; treating extraction stream; discharging effluent; disposing of residuals; monitoring groundwater.

3) RAA-4 - Installing extraction wells; building a treatment plant featuring Biological Activated Carbon (BAC); treating extraction stream; discharging effluent; disposing of residuals; monitoring groundwater.

4) RAA-5 - Installing extraction wells; building a treatment plant featuring sand filtration and ozone/UV; treating and discharging effluent to a Publicly Owned Treatment Works (POTW) for post-treatment; disposing of residuals; monitoring groundwater.

5) RAA-5A - Installing extraction wells; building a treatment plant featuring sand filtration, ozone/UV, and activated sludge; treating extraction stream; and disposing of residuals; monitoring groundwater.

EPA'S PREFERRED RAA AND REASON FOR ITS SELECTION

EPA's preferred alternatives for remediation of the Drake Chemical Site are Alternative A-1 for remediation of sludges/soils/sediments and RAA-4 for groundwater remediation (see Figures 3 and 4). These alternatives feature incineration of contaminated materials in a rotary kiln incinerator and treatment of contaminated groundwater at an onsite treatment plant that uses the Biological Activated Carbon process to remove substances of concern.

EPA prefers these alternatives because they represent proven technologies. Following appropriate treatability studies, EPA is confident that these alternatives can be effectively employed to permanently remediate at the site.

PUBLIC PARTICIPATION IN THE RAA SELECTION

EPA considers public participation in the decision-making process associated with site remediations to be vital. Consequently, the Agency makes site-related documents available to the public at locations in the community. For the Drake Chemical Site, information repositories were established at the Annie Halenbake Ross Library; the Stevenson Library at Lock Haven University of Pennsylvania; and the Clinton County Court House, all located in Lock Haven, and at the Pennsylvania Department of Environmental Resources Bureau of Solid Waste Management in Williamsport.

EPA is also required to announce the availability of the RI/FS Report and to provide a public comment period to allow community members to express their comments and concerns. The comment period for the Drake Chemical Site begins on August 30, 1988, and extends to September 28, 1988. To facilitate commenting, a public meeting will be held on September 7, 1988, at 7:00 pm, in the Ulmer Planetarium, Lock Haven University of Pennsylvania.

Comments, inquiries, and requests for additional information may also be made by contacting the following EPA representatives:

Mr. Ray Germann (3PA00)
Community Relations Coordinator
(215) 597-9871

Mr. Roy Schrock (3HW21)
Regional Project Manager
(215) 597-0913

US EPA
841 Chestnut Street
Philadelphia, Pennsylvania 19107

Following the public comment period, EPA will make final cleanup decisions.

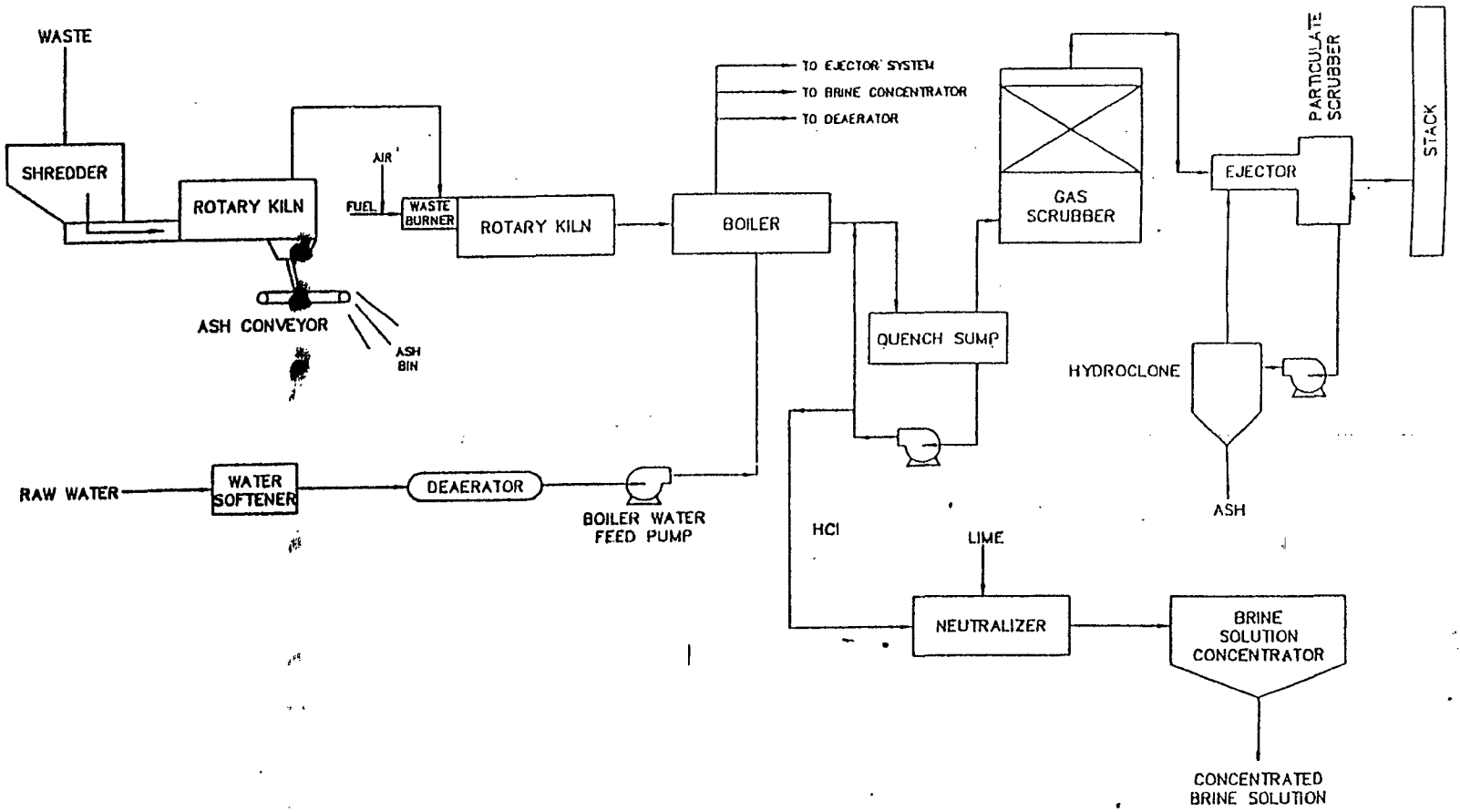

FIGURE 3

OPERABLE UNIT A – ALTERNATIVE A1 DETAILED SCHEMATIC
ROTARY KILN INCINERATION
DRAKE CHEMICAL SITE, LOCK HAVEN, PA

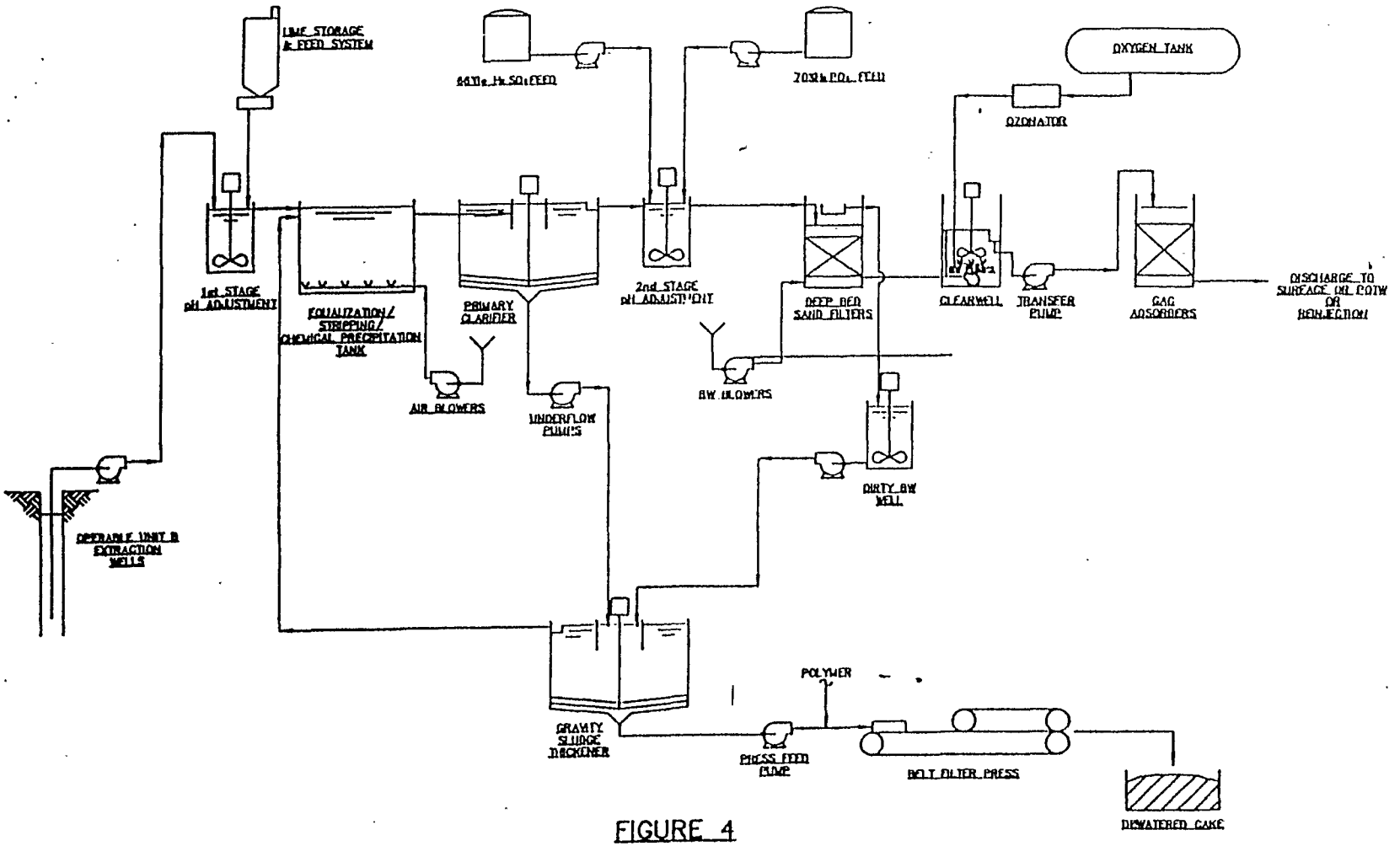

FIGURE 4
ALTERNATIVE NO. 4 DETAILED SCHEMATIC
BIOLOGICAL ACTIVATED CARBON (BAC)
DRAKE CHEMICAL SITE, LOCK HAVEN, PA

ADDITIONAL STEPS OF THE REMEDIAL PROGRAM

At the close of the public comment period, a Responsiveness Summary discussing the major comments received and the EPA's responses to them will be compiled. An official Record of Decision (ROD) will then be developed, based on the CERCLA, NCP, and SARA requirements discussed previously and on the comments received from the public. The ROD will describe final selections of cleanup alternatives for each Phase III operable unit and give a detailed accounting of the rationale for these choices. A public notice will announce the EPA's final decisions.

Once the ROD is issued, treatability studies will be conducted to determine the exact requirements for implementing each of the technologies. Data from the treatability studies will be used to develop the engineering design of the selected actions.

Depending upon which alternative is selected, remediation of the soil/sludges should take from three to five years using RAA A-1, B-1, or C-1, and up to thirty years using RAA D-1. Remediation of the groundwater will also require approximately thirty years.

PROPOSED PLAN GLOSSARY

The definitions presented below apply specifically to the use of the terms in this document which was prepared for a Superfund site remediation. These words may have other meanings in standard usage.

Aquifer: An underground rock or rock formation through which groundwater moves, such as sand, gravel, or fractured bedrock.

Bedrock: Solid rock underlying the looser materials on the earth's surface, such as soil, sand, clay, and gravel.

Biological Activated Carbon: Treatment technology that combines filtration, ozone treatment, biological treatment, and carbon adsorption processes in a packaged system to destroy organic contaminants in water.

Biological Treatment: Treatment that introduces bacteria, known to thrive on waste materials, to contaminated media, such as soil. Several classes of hazardous wastes can be degraded biologically, including petroleum products, creosoting wastes, refinery sludges, and coal tars.

Carbon Adsorption: The process by which specially treated carbon attracts and holds gas, vapor, or dissolved matter. Carbon adsorption is used in some water treatment processes that force contaminated groundwater and surface water through tanks of activated carbon to remove contaminants.

Effluent: The water from a wastewater treatment plant that, following treatment, is discharged to either a publicly owned treatment works for further treatment or to local surface water.

Enforcement: Activities undertaken by EPA to force a responsible party to perform or pay for a Superfund site remediation. Enforcement may involve legal actions, if necessary.

Engineering Design: Planning phase of a project in which equipment type, layout, and size; construction materials; and operational limits are determined.

Extraction Wells: Holes bored into the earth from which aquifer water can be removed by pumping.

Flushing Agent: Fluid caused to flow through contaminated soil in order to dissolve or dislodge contaminants in the soil and carry them away.

Groundwater: Water beneath the earth's surface that occupies the spaces between particles of material such as soil, sand, and gravel, or within the fractures in bedrock. Groundwater is the source of well and spring water and is replenished by normal precipitation, such as rain or snow.

Incineration: The burning of certain materials under controlled conditions to destroy unwanted matter.

> **Infrared Incineration**: Incineration that uses a carbon steel reactor chamber lined with ceramic fiber and silicon carbide resistance heating elements as a power source.
>
> **Rotary Kiln Incineration**: Incineration powered by fossil fuels that occurs in a slowly rotating, heat-resistant, ceramic-lined cylinder.

Information Repository: A reference file of site-related information, including technical reports and reference documents, regarding a specific Superfund site and located in a public building within easy access of the affected community.

Infrared Incineration: See Incineration.

Injection Wells: Holes bored into the earth through which water can be introduced to the aquifer by pumping.

Inorganics: Substances without carbons. Metals or cyanide.

In Situ: In the original location.

In Situ-Soil Washing: In-place treatment process that circulates fluid through the pore structures of contaminated soils to dissolve or dislodge the contaminants and carry them away. The contaminant-laden fluid is then collected and treated to remove the compound of concern.

In-Situ Vitrification: In-place treatment process that uses heat to convert contaminated soil into a chemically inactive glass and crystalline product, while simultaneously collecting and removing process by-products.

Leachate: A contaminated fluid that occurs when soluble components in waste materials are dissolved by water (i.e. rainwater, melting snow, etc.) soaking into the waste materials.

Monitoring Wells: Wells installed at specific locations for the purpose of studying the groundwater. These wells help to determine such things as groundwater flow direction and the nature, degree, and extent of groundwater contamination.

Operable Unit: A portion of a larger study that can be addressed separately. Operable Units are typically identified when a site is particularly complex or when there is a need to address a specific problem more quickly than a large study would allow.

Organic Compounds: Of, relating to, or containing carbon as a constituent of a substance.

Ozone: A naturally occurring gas that can be used to purify and deodorize air and water. Ozone can also be used as a bleach.

Ozone/UV: Treatment technology that combines ultraviolet (UV) light and ozone to oxidize and chemically destroy organic pollutants in contaminated water.

Percolation: The seeping, oozing, or trickling of water through soil or waste particles.

Remedial Action Alternative (RAA): A combination of technologies that can be used to remediate a Superfund site.

Remedial Investigation/Feasibility Study (RI/FS): Separate or concurrent studies performed to determine the nature and extent of contamination at a Superfund site, to establish criteria for site remediation, to identify applicable remedial action alternatives, and to assess costs for implementing the remedial alternatives.

Responsible Party (RP): Any person or company known to have contributed to contamination at a Superfund site and who can be held responsible for remediation expenses. Responsible parties may include owners or operators of sites, as well as operators and haulers of hazardous substances.

Rotary Kiln Incineration: See Incineration.

Sand Filtration: Treatment process that removes suspended solids and associated contaminants from a wastewater stream by percolating it through a layer of sand; the contaminants settle in the spaces between the sand particles.

Surface Water: Bodies of water on the earth's surface such as streams, lakes, and rivers. Surface water is replenished by precipitation and by groundwater discharge.

Technology: A method or material developed through applied science to address a specific condition or circumstance.

Treatability Study: Testing performed to define the physical and chemical limitations of the technology being evaluated.

US ENVIRONMENTAL PROTECTION AGENCY (EPA) SEEKS COMMENTS ON REMEDIAL ACTION ALTERNATIVES PROPOSED FOR THE PHASE III SUPERFUND REMEDIATION OF THE DRAKE CHEMICAL SITE.

EPA HAS PREPARED A PROPOSED PLAN DESCRIBING REMEDIAL ACTIONS UNDER CONSIDERATION FOR USE AT THE SITE. AGENCY REPRESENTATIVES WILL HOLD A PUBLIC MEETING TO DISCUSS THE PLAN ON WEDNESDAY, SEPTEMBER 7, 1988, AT 7PM, IN THE ULMER PLANETARIUM, LOCK HAVEN UNIVERSITY OF PENNSYLVANIA.

The Drake Chemical Site is the location of an inactive chemical manufacturing facility that produced chemical intermediates for a variety of industries from 1962 to 1981. The 12 1/2 acre site has been the subject of numerous EPA remedial actions since 1982 when an emergency removal action removed contaminated surface materials and fenced the site. Most recently, EPA has concluded Phase III of a long-term Remedial Investigation/Feasibility Study (RI/FS) that began with Phase I in 1983.

During Phase III, soils/sludges/sediments were identified as Operable Unit A and groundwater contamination as Operable Unit B. Organic compounds and cadmium were determined to be the major contaminants of concern, and a larger quantity of contaminated soils/sludges was identified than previously indicated. Site-related contaminants were also determined to be migrating off site toward Bald Eagle Creek via the groundwater. The Phase III RI/FS concluded that maximum contaminant levels (MCLs) have been exceeded in the groundwater but have not been exceeded in the bedrock aquifer or in surface waters of Bald Eagle Creek.

EPA is currently considering the Remedial Action Alternatives (RAAs) described below to address conditions at the site. Except for the No Action Alternatives, all the RAAs include flood protection measures.

Operable Unit A - Sludges/Soils/Sediments:

1) No action with monitoring.

2) A-1 - Excavate all sludges/soils/sediments; incinerate in a rotary kiln incinerator; dispose ash; restore site surface.

3) B-1 - Excavate all sludges/soils/sediments; incinerate in an infrared incinerator; dispose ash; restore site surface.

4) C-1 - Immobilize contaminants with in-situ vitrification; restore site surface.

5) D-1 - Install injection and extraction wells for in-situ soil washing, using Operable Unit B Wastewater Treatment Plant effluent as a flushing agent; treat resulting wastewater.

Operable Unit B - Groundwater and leachate:

1) No action with monitoring.

2) Modified RAA-1 - Install extraction wells; build a treatment plant using sand filtration and carbon adsorption; treat and discharge extraction stream; dispose residuals; monitor groundwater.

3) RAA-4 - Install extraction wells; build a treatment plant featuring Biological Activated Carbon (BAC); treat and discharge extraction stream; dispose residuals; monitor groundwater.

4) RAA-5 - Install extraction wells; build a treatment plant featuring sand filtration and ozone/UV; treat and discharge to a Publicly Owned Treatment Works (POTW) for additional treatment; dispose residuals; monitor groundwater.

5) RAA-5A - Install extraction wells; build a treatment plant featuring sand filtration; ozone/UV, activated sludge; treat extraction stream; dispose residuals; monitor groundwater.

EPA's preferred alternatives are Alternative A-1, Operable Unit A, and RAA-4, Operable Unit B. Because of the proven ability of these technologies, EPA is confident that these alternatives can effectively remediate the conditions present at the Drake Chemical Site.

No final decision has yet been made. EPA encourages residents to review the Proposed Plan and other site-related materials, and to make comments or express concerns during the public comment period that begins on August 30, 1988, and ends on September 28, 1988. These materials are available at the Annie Halenbake Ross Library, 232 West Main Street; the Stevenson Library, Lock Haven University; the Clinton County Court House, Commissioner's Office; or City Hall, 20 E. Church Street. Comments, questions, and concerns may also be presented at the public meeting or addressed to the EPA spokesmen listed below:

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